

APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS



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Presented here in descending order of the amount released on-site to air, water, and/or land (see Figures 2-4 on pages 6-8) are the top 15 TRI chemicals. This information is presented as a quick reference summary of information for these toxic chemicals. This is not a detailed source of information on the sources, uses, or hazards of these chemicals. This information was obtained from the Hazardous Substance Fact Sheets provided by the New Jersey Department of Health and distributed by the EPA. The source for this information is listed in the For Further Information section in pages 50-51 of this report. The reader may also consult other chemical or toxicology reference materials to learn more about chemicals of interest. One such source is the Agency For Toxic Substances And Disease Registry. This source has a web site that has extensive information about many of the toxic chemicals in this report at: <http://www.atsdr.cdc.gov/toxpro2.html> as well as a shorter summary that answers many common questions about the chemical at: <http://www.atsdr.cdc.gov/toxfaq.html>. Excerpts for Nitrate Compounds came from EPA The National Nitrate Compliance Initiative, April 2002. Excerpts for metallic compounds came from EPA Risk Burn Guidance for Hazardous Waste Combustion Facilities.

AIR - From Figure 2 on page 6

Hydrochloric Acid (Hydrogen Chloride)

(Aerosol portion only is reportable)

Used in: Metal processing and cleaning, analytical chemistry, and making other chemicals. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Can cause skin and eye burns, irritation of mouth, nose and throat.

Sulfuric Acid

(Aerosol portion only is reportable)

Used in: Fertilizers, chemicals, dyes, petroleum refining, etching, analytical chemistry, metal manufacturing, and explosives. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Can cause skin and eye burns, irritation of mouth, nose and throat.

Hydrogen Fluoride

Used in: Etching glass, manufacturing chemicals and gasoline. Also produced during coal and oil combustion at power generating facilities.

Hazard: Corrosive. Can cause severe irritation to the eyes, nose, throat and skin. Toxic by inhalation and ingestion or skin absorption.

Carbonyl Sulfide

Used in: Chemical manufacturing

Hazard: Can irritate the eyes, nose, and throat and skin, toxic by inhalation and ingestion or skin absorption. High exposure may cause nausea, dizziness, confusion, and vomiting, increased or irregular heartbeat.

Ammonia

Used in: Refrigerant, in manufacturing fertilizer, plastics, dyes, and textiles. A product of natural organic decomposition, run-off from fields and feedlots, waste treatment plant and refinery/chemical manufacturing effluents.

Hazard: May irritate lungs, eyes, nose, throat, and mouth. Corrosive, can severely damage eyes and cause permanent damage. Contact with liquid can freeze skin.

APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS

Certain Glycol Ethers

Used in: Solvents.

Hazard: Can irritate the eyes, nose, throat, and skin. Toxic by inhalation and ingestion or skin absorption.

Xylene – Mixed Isomers

Used in: Solvents and in making drugs, dyes, insecticides, and gasoline.

Hazard: Can irritate the eyes, nose, and throat. Toxic by inhalation and ingestion. May cause memory and concentration problems. Repeated exposure may cause low blood cell count.

N-Hexane

Used in: Chief constituent of petroleum ether, gasoline, and rubber solvents. Also used in solvents for adhesives, in organic analysis, to extract vegetable oils from crops such as soybeans, and in denaturing alcohols.

Hazard: Toxic when inhaled, ingested, or by skin contact. Exposure can cause numbness, lightheadedness, giddiness, headaches, and nausea. Flammable liquid and a fire hazard.

Vinyl Chloride

Used in: Plastics and chemical manufacturing

Hazard: Carcinogen, mutagen. Toxic by inhalation and ingestion or skin absorption. May cause damage to developing fetus. May damage liver, kidneys, bones, blood vessels, and skin. Exposure may cause you to feel drowsy or lightheaded.

Ethylene

Used in: Polymer, plastic, solvent, resin, and antifreeze production in the petroleum and chemical industries.

Hazard: Exposure is primarily by inhalation. Can cause dizziness and unconsciousness. Skin contact may cause frostbite. Is flammable, explosive, and reactive.

Methanol

Used in: Solvents, cleaners.

Hazard: Toxic when inhaled, ingested, or by skin contact. Exposure may cause blindness, nausea, headaches, vomiting, and dizziness. Flammable and a fire hazard.

Vinyl Acetate

Used for: Plastics and chemical manufacturing.

Hazard: Can irritate the eyes, skin, nose, and throat. High levels of exposure can cause dizziness. May damage the lungs. Is a hazardous substance, is flammable and reactive. Is soluble in water and toxic to wildlife.

Styrene

Used in: Making polystyrene plastics, protective coatings, polyesters, resins, and as a chemical intermediate.

Hazard: Carcinogen, mutagen. Toxic by inhalation or skin absorption. Can cause eye, nose, and throat irritation. Repeated exposure may cause concentration and memory problems. Higher levels may cause dizziness. Very high levels may be fatal or cause brain and liver damage.

APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS



1,2,4,-Trimethylbenzene

Used in: Manufacture of dyes, pharmaceuticals.

Hazard: Toxic when inhaled and by skin contact. Can irritate the nose, throat, and eyes. Contact can irritate the skin. Prolonged contact may cause skin burns. Repeated exposure may damage the liver and kidneys.

N-Butyl Alcohol

Used in: Solvent for fats, resins, waxes, gums, shellac, and varnish. Also used in manufacture of chemicals and oils.

Hazard: Toxic by inhalation and ingestion or skin absorption. May irritate and damage skin and eyes on contact. Breathing high concentrations can cause coughing, wheezing and shortness of breath, can cause headache, nausea, vomiting and dizziness, and may lead to an irregular heartbeat. Exposure may damage the liver, heart, kidneys, hearing and the sense of balance.

WATER – From Figure 3 on page 7 - Chemicals not reported in the Air section above

Nitrate & Nitrite Compounds (Sodium Nitrate, Sodium Nitrite)

Nitrates are toxic chemicals that can pose serious risks to human health and the environment. High levels of nitrates may cause significant environmental damage to streams, lakes, and rivers. Elevated levels of nitrates may damage surface water and ground water with excess nutrients and can cause algae blooms in coastal waters, which can remove oxygen from the water and result in fish kills. High levels can displace oxygen from the bloodstream and produce blue color in the skin and lips. The National Academy of Sciences recently reported that pollution by nitrogen and phosphorous were causing damage in most of the nation's coastal inlets, and severe problems were identified in 44 of the 139 coastal areas examined.

Manganese and Manganese Compounds *

Used in: Dry-cell batteries, steelmaking, matches, fireworks, in animal feed, fertilizer, livestock nutritional supplements, in glazes and varnishes, and in ceramics, for water purification purposes in water and waste-treatment plants.

Hazard: Toxic when Inhaled. Repeated exposure can cause brain damage, may damage kidneys and liver.

Cresol (Mixed Isomers)

Used in: Making synthetic resins, photographic developers, explosives. Used in disinfectants and fumigants.

Hazard: Toxic by inhalation or skin exposure. Corrosive, will cause skin and eye burns, possibly blindness. Soluble in water, toxic fish life. Is on the hazardous substances list.

Phenol

Used in: Making plywood, pharmaceuticals, plastics, and rubber. Common product of refinery wastes

Hazard: Toxic by inhalation or skin exposure. Mutagen; can cause genetic changes, will cause skin and eye burns, possibly permanent eye damage. Soluble in water, toxic to fish life. Is on hazardous substances list.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing.

APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS

Barium and Barium Compounds *

Used in: Spark plugs and engine rod bearings, and to remove gas from vacuum tubes and television picture tubes.

Hazard: Toxic when inhaled, may irritate skin, eyes, nose and throat.

Vanadium Compounds *

Used in: Steel alloys, other Vanadium compounds, x-ray equipment, sulfuric acid, and synthetic rubber.

Hazard: Toxic when inhaled. Can irritate skin, nose, throat and lungs.

Copper and Copper Compounds *

Used in: Electrical wiring, plumbing, fungicides, pesticides, electroplating, paint pigments and catalysts.

Hazard: Toxic when inhaled. Can irritate the eyes, nose and throat. May cause a skin allergy. Repeated high exposure to copper may affect the liver.

Toluene

Used in: Solvent for perfumes, medicines, dyes, explosives, detergents gasoline and chemicals.

Hazard: Toxic when inhaled, ingested, and by skin contact. It may damage the developing fetus. Contact can irritate the skin and eyes. Breathing toluene can irritate the nose and throat causing coughing and wheezing. Exposure can affect the nervous system causing trouble concentrating, headaches, and slowed reflexes. Repeated Toluene exposure may cause liver, kidney and brain damage. Highly flammable and explosive.

Zinc and Zinc Compounds *

Used in: Rustproof coating on iron and steel, making brass alloys, car parts, electroplating, batteries, electrical products, paints, and fungicides.

Hazard: Zinc oxide fumes (released during welding on galvanized metal) are toxic when inhaled. Zinc dust is a skin irritant.

Nickel and Nickel Compounds *

Used in: Alloys and electroplating, catalysts, dyes, and textile printing.

Hazard: Carcinogenic. Toxic by inhalation. Eye and skin irritant. Repeated exposure may cause scarring of the lungs and may affect the kidneys.

Lead and Lead Compounds *

Used in: Storage batteries, ammunition, cable covering, ceramic glazes, casting metals and solders.

Hazard: Toxic by ingestion. Can cause brain damage, particularly in children, suspected carcinogen.

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APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS



Ethylbenzene

Used in: Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

Hazard: Toxic by inhalation, will irritate eyes, nose, throat, and skin. Exposure may cause dizziness, lightheadedness, and difficulty in breathing.

Hydrogen Cyanide and Cyanide Compounds

Used in: As insecticide for closed spaces, metal electroplating, and metal treatment.

Hazard: Extremely toxic by inhalation. Will depress the central nervous system. Will cause weakness and loss of coordination, headache, nausea, eye and skin irritation, and in higher concentrations will cause death in humans.

LAND – From Figure 4 on page 8 - Chemicals not reported in the Air and/or Water sections above

Chromium Compounds *

Used in: Stainless and alloy steels, refractory products, tanning agents for leather, pigments, electroplating, catalysts, and corrosion-resistant products.

Hazard: Irritant and corrosive to human tissue, chromium compounds are carcinogens. Hexavalent compounds are more toxic than trivalent compounds.

Arsenic Compounds *

Used in: Pesticides, animal feed production, wood and tanning preservative, ammunition and semiconductor industries.

Hazard: Arsenic trioxide is a carcinogen, and may damage the liver and kidneys. Exposure can be through inhalation, ingestion or absorbed through the skin. Ingestion can result in stomach ache, nausea, vomiting and diarrhea. It can also result in decreased production of red and white blood cells which may cause fatigue, abnormal heart rhythm, blood-vessel damage resulting in bruising, and impaired nerve function. One of the early warning signs of arsenic poisoning is a "pins and needles" sensation in hands and feet.

Cobalt Compounds *

Used In: Production of alloys used in the manufacture of aircraft engines, magnets, grinding and cutting tools, artificial hip and knee joints. Cobalt compounds are also used to color glass, ceramics and paints, and used as a drier for porcelain enamel and paints. Cobalt compounds enter the environment from natural sources and the burning of coal or oil.

Hazard: Primarily by ingestion. Cobalt can benefit or harm human health. Cobalt is beneficial for humans because it is part of vitamin B12. Exposure to high levels of cobalt compounds can result in lung and heart effects and skin problems. Liver and kidney effects have also been observed in animals exposed to high levels of cobalt.

Antimony Compounds

Used in: Lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and plastics to prevent them from catching fire. It is also used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass. It is a by-product of smelting lead and other metals.

Hazard: By contact and ingestion. Can irritate eyes, nose, throat and skin. At high levels, can cause nausea, headaches, abdominal pain, and breathing difficulty.

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APPENDIX K

COMMON TOXIC CHEMICALS AND THEIR HAZARDS

Mercury and Mercury Compounds *

Used in: Thermometers, barometers, vapor lamps, mirror coatings, and in making chemicals and electrical equipment.

Hazard: The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury may permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Dioxin and Dioxin-like Compounds

Chlorinated Dibenzo-p-dioxins (CDDs) are a family of 75 different compounds commonly referred to as polychlorinated dioxins. These compounds have varying harmful effects, and are considered to be very toxic.

Used in: CDDs are not intentionally manufactured by industry, except in small amounts for research purposes. They are naturally produced from the incomplete combustion of organic material by forest fires or volcanic activity. They are unintentionally produced by industrial, municipal, and domestic incineration and combustion processes. CDDs formed during combustion processes are associated with small particles in the air, such as ash. The larger particles will be deposited close to the emission source, while very small particles may be transported longer distances. Some CDDs may vaporize and be transported long distances in the atmosphere, even around the globe. CDDs are found everywhere in the environment, and most people are exposed to very small background levels of CDDs when they breathe air or consume food. The most common way CDDs can enter your body is by eating food contaminated with CDDs. CDDs deposited on land from combustion sources or from herbicide or pesticide applications bind strongly to the soil, and therefore are not likely to contaminate groundwater by moving deeper into the soil.

Hazard: The most noted effect in people exposed to large amounts of one CDD, 2,3,7,8-TCDD, is chloracne, a severe skin disease. Other skin effects, including rashes and skin discoloration have also been noted. Changes in urine and blood that indicate liver damage may have occurred were also noted.

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